

New Northern Limit for the Limpet, *Acmaea digitalis*

BY

WILLIAM F. JESSEE

School of Medicine, University of California, San Diego
La Jolla, California 92037

DURING THE RECENT Bering Sea Expedition of the research vessel *Alpha Helix*, there was some brief opportunity to examine the intertidal fauna of the southern coast of the Bering Sea. The intertidal zone in this region presents an extremely hostile environment in comparison with either the strictly terrestrial or the strictly marine zones. During the winter, intertidal invertebrates are exposed twice daily to submergence in water of temperatures from $+2^{\circ}$ to -1.5° C, followed by exposure to air in which temperatures of -10° C or lower are quite common. Survival and propagation under such conditions is indeed remarkable.

In mid-March, 1968, 6 specimens of the limpet *Acmaea digitalis* ESCHSCHOLTZ, 1833 were collected from the rocks along the shore of the enclosed bay at Dutch Harbor, on the Bering Sea side of Unalaska Island. The area of collection was at a latitude of about $53^{\circ}50'N$. Air temperatures ranged from a daily high in the mid-thirties (Fahrenheit) to an early morning low of $+15^{\circ}$ to $+20^{\circ}$ F. The animals collected were unremarkable in any aspect of their morphology, and were definitely identified as specimens of *A. digitalis*. The largest specimen measured 25 mm in length, 18 mm in width, and 15 mm in height.

As far as can be determined from the literature, this is the first instance in which *Acmaea digitalis* has been reported from the Bering Sea. TEST (1945, 1946) cites *Acmaea* as being a Pacific genus with the northern limit of distribution of *A. digitalis* being the Aleutians. Earlier works (DALL, 1871, 1878) appear somewhat contradictory in their descriptions of the distribution of this species, but in no instance does reference appear to its occurrence on the shores of the Bering Sea. DALL (1871) states that the northern limit appears to be Cape Spencer (near Juneau), a region of much milder climate than Unalaska Island. Attempts to locate specimens of *Acmaea* species further north, through colleagues in Nome and on the island of Nunivak, were unsuccessful. Although their reports are most likely correct, personal confirmation of

the absence of *Acmaea* in these areas is not available at this time.

That an intertidal species should have such a wide distribution as does *Acmaea digitalis* seems truly amazing. At the southern extreme of its distribution, near San Diego, California, individuals may be exposed to temperatures as high as 35° to 40° C during summer low tide periods, while at Dutch Harbor the animals are subject to winter low tide temperatures considerably below the freezing point of sea water. It is hoped that studies on temperature tolerances, desiccation, and freezing resistance in this species can soon be undertaken.

ACKNOWLEDGMENTS

The author wishes to express his gratitude to Professor Per F. Scholander, director of the Physiological Research Laboratory of Scripps Institution of Oceanography, for the opportunity to participate in his phase of the Bering Sea Expedition of the R/V *Alpha Helix*. This expedition was made possible by grant GB-7173 from the National Science Foundation to Professor Scholander.

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